

REMARKS

Applicant has amended claims 20 and 28 to overcome the rejection under 35 USC 112. Applicant has also amended a number of the claims to better define the invention. Applicant respectfully traverses the rejection over the cited art and respectfully requests reconsideration. A petition to extend time for one month is enclosed. The withdrawn claims are canceled.

Referring to Figure 6 of this application, as an example, not in a limiting manner, claim 12 as amended requires inserting a mandrel 101 into the tubular work piece 102 and sealing between an outer diameter portion of the mandrel and an inner diameter portion of the tubular work piece. The seals are illustrated by the numeral 110 in Figure 6. The claim requires applying fluid pressure to the annular space between the mandrel and the work piece to force the tubular sidewalls radially outward against the confining surface and into the mold cavities. The confining surfaces comprise the mold elements 107 and 108 shown in Figure 5, and the cavities are illustrated by the numeral 109.

Hollerith discloses forming a corrugated exterior by moving a piston C1 axially against the tubular work piece, which contains an incompressible fluid inside. Some of the fluid is allowed to bleed out through a valve i as the work piece deforms outwardly into the mold elements D3. Claim 12 distinguishes over Hollerith in that it requires a mandrel and fluid pressure to cause the deformation, neither of which is shown in Hollerith.

Claim 13 further defines the mold elements to be tubular members, which are shown by the numerals 107 and 108 in Figure 5. The tubular members 107 and 108 have ends 112 that abut each other. Claim 13 requires that each cavity 109 have a portion contained within one of the mold elements and another portion in the other. As you see, these cavities join each other to define the shape of the rib. When removing the mold elements 107 and 108 from the work piece, they can be moved axially apart from each other since they are separate members. In Hollerith, the mold elements comprise separate cylindrical rings, but they do not abut each other end to end.

Claim 14 specifically requires that each of the cavities has opposite ends that are spaced apart from each other and along the length of the confining surface. Claim 15 further requires that the ends be circumferentially spaced apart from each other so as to define the helical configuration of the ribs. The mold elements D of Hollerith do not have ends spaced apart from each other.

Claim 16 requires that the mold elements contain axially extending slits 113 (Figure 5) to permit their circumferential expansion for removing them from the tubular work piece.

Claim 17 more specifically requires the confining surface to include a cylindrical bell 106 having a tapered bore, and a collet 104 having a tapered outer surface that mates with the inner diameter of the bore. It requires moving the collet axially relative to the bell, then removing the tubular work piece along with the mold elements from the collet. As shown in Figure 6, collet 104 can be forced to slide axially to the right, which frees up mold elements 107 and 108 to be moved either to the right or the left along with mandrel 101 and work piece 102. Claims 18, 19 and 20 define features previously discussed.

Independent claim 27 requires positioning the tubular work piece and mold elements so that the tubular work piece is within substantial cylindrical confining space formed by the mold elements. It requires placing the mold elements and the tubular work piece together within a bell. The mold elements D of Hollerith are not located within the housing, not inserted into the housing along with the tubular work piece. Claim 27 requires removing the centralizer and mold elements from the bell, then removing the mold elements from the centralizer. This is not suggested by Hollerith.

Claim 28 requires inserting a mandrel 101 (Figure 6) into the central opening of the tubular work piece 102, sealing about a space formed between work piece 102 and mold elements 107, 108. It requires applying sufficient fluid pressure to that space to deform portions of the work piece into the cavities. As discussed above, this is not suggested in Hollerith. Dependent claim 31 specifies that the mold elements comprise two cylindrical members 107, 108

that abut end-to-end. It requires sliding the mold elements in opposite directions relative to an axis of the mold elements to remove the mold elements from the work piece.

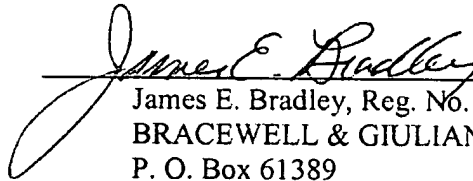
Claim 33 is similar to claim 17, requiring a tapered bore in the bell, a collet, and a tapered outer surface that mates with the inner diameter of the bore and receives the mold elements within it. It requires moving the collet axially relative to the bell to remove the tubular work piece from the bell.

Kirk US2003/0010540 and Williamson 6,092,93 were cited for the purpose of coatings being applied to the inner diameter and also to exterior surfaces of the ribs. These patents do not suggest features discussed in the independent claims mentioned above.

It is respectfully submitted that the claims are now in condition for allowance and favorable action is respectfully requested.

Respectfully submitted,

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